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FINAL REPORT

VIRTUE GULCH PROJECT
MT A/E 86-46-121
CARBON COUNTY, MONTANA

December, 1987

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FINAL REPORT

VIRTUE GULCH PROJECT
MT A/E 86-46-121
CARBON COUNTY, MONTANA

December, 1987

Prepared for:

MR. RICHARD JUNTUNEN, CHIEF
Abandoned Mine Reclamation Bureau
Department of State Lands
1625 11th Avenue
Helena, MT 59620

Prepared by:

L.C. HANSON COMPANY
Consulting Engineers
3108 McHugh Lane
PO Box 299
Helena, MT 59624

ALLAN W. NYE, P.E.
Project Engineer

Willard "Bill" Kramlich
Ed Larson, E.I.T.
Project Inspectors

L. C. HANSON COMPANY
CONSULTING ENGINEERS & SURVEYORS
HELENA — GREAT FALLS — GLENDIVE

FINAL REPORT
VIRTUE GULCH PROJECT

I. INTRODUCTION

A. PROJECT OBJECTIVES

The VIRTUE GULCH PROJECT reclamation work was undertaken to clean up debris, remove structures, close mine openings, backfill subsidence features, excavate and regrade coal waste materials, install adit drainage facilities, and revegetate all disturbed areas. Fencing of the topsoil borrow area and waste pile disposal area were also accomplished.

This project also included topsoiling and revegetating the old dump site at the Red Lodge Airport. Removal of coal waste materials from this dump site was accomplished during previous projects. Repairs to the roadside ditch along the Airport Road were also accomplished.

B. HISTORY

The structures, mine openings and coal waste materials were left from past mining activities at several mines. Debris was dumped by the public in the past at the mine disposal sites. Little is known about the extent of the mine workings, but it is known that vast amounts of coal were mined in the Bearcreek area.

C. PROJECT LOCATION

The work sites at Virtue Gulch consist of mines located in Sections 31 and 32, T7S, R21E and in Sections 5 and 6, T8S, R21E, approximately 1 mile northwest of Bearcreek, Montana and 4 miles east of Red Lodge, Montana.

The work site at the Red Lodge Airport was adjacent to the west side of the Red Lodge City limits in Section 27, T7S, R20E.

D. SITE DESCRIPTIONS AND PROBLEMS

Since names of the various mines are unknown, the work was broken down into areas of work. Area I contained one open adit and two partially-collapsed adits, a wooden tippie and shed and coal waste piles adjacent to the Virtue Gulch drainage.

Area II contained three closed adits, a wooden tippie, a large dump, and coal waste materials on both sides of the Virtue Gulch drainage as well as in minor drainages adjacent to Virtue Gulch.

Area III contained two collapsed adits which yielded some water flow, subsidence features above the adits and coal waste materials below the adits.

Area IV contained numerous subsidence holes over an abandoned mine approximately 650 feet above Virtue Gulch.

The Red Lodge Airport site contained a barren 9± acre site from which coal waste materials had been removed on earlier projects.

The trash dump, the abandoned and partially-collapsed structures, the existing adits, and the subsidence features posed hazards to man and livestock. The coal waste piles did not sustain vegetation and thus were subject to air and water erosion.

The construction limits were confined basically to the numerous scattered work areas. The landowner of a 40-acre parcel in Area II would not give consent for the construction work on his property and that work was deleted from the Contract. The trash dump extended beyond the original construction limits of Area II, and at the request of the landowner, the entire dump was cleaned up.



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The disturbed areas in Virtue Gulch totaled approximately 17.0 acres while the work at the Airport Dump totaled approximately 9.0 acres.

II. DESCRIPTION OF RECLAMATION PROJECT

A. PROJECT PLANNING

The major items of work consisted of alleviating health and safety hazards. The removal of coal waste materials from movement by nature constituted the largest item of work. These materials were buried in subsidence features or regraded and sealed in areas above drainages. Removal of trash and abandoned and/or collapsed structures, regrading of collapsed adits and backfilling of subsidence features eliminated safety hazards. Work not accomplished on this project when the landowner would not permit construction consists of trash and debris to be cleaned up over 9.5± acres, closing of one collapsed adit, removal and regrading of approximately 4000 C.Y. of coal waste material existing adjacent to both sides of Virtue Gulch, and the revegetation of approximately 1 acre of disturbed land.

B. CHRONOLOGICAL HISTORY

1. Project advertised for three consecutive weeks.
2. Pre-Bid Conference held on-site on November 5, 1986.
3. Bids opened on November 18, 1986.
4. Contract awarded on November 19, 1986 to:
MONTGOMERY CONSTRUCTION
Box 755
Hilger, MT 59451
with work to commence in the Spring of 1987 at the earliest.
5. Pre-Construction Meeting held on September 10, 1987.
6. Work commenced on September 14, 1987.
7. All work, with exception of fencing, completed on October 23, 1987.

8. Fencing was completed on November 5, 1987.

C. EQUIPMENT

1. CAT D7E Dozer
2. CAT 966 Front-End Loader
3. John Deere 310 Backhoe
4. 2,600 Gal Water Truck
5. 5-End Dump Trucks - 12 C.Y. cap
6. Hydro-Seeder (lime placement)
7. John Deere Tractor w/Disc
8. 1-Ton Mech. Truck w/Welder
9. 2-Ton Service Truck
10. CAT #12 Motor Patrol
11. Hydro-Mulcher
12. 2-Ton Truck
13. Ford Tractor w/Drill
14. 2 1/2-Ton Pickups
15. Post Hole Auger

D. CONSTRUCTION OPERATIONS

The Order of Work was changed at the pre-construction meeting to concentrate all efforts of completing work in Area III and IV as soon as possible, as only rubber-tired equipment could be used in these areas, and due to the lateness of season, early fall snows could have restricted access to these sites. Some operations took place concurrently between Areas III and IV and Area II. Therefore, the salvaging of topsoil from subsidence holes and borrow areas commenced in Area IV with rubber-tired backhoe and 966 front-end loader. Concurrently the D7 dozer was grading the spoil pile in Area II. When all topsoil was removed from the subsidence holes and backfilling could begin, the backhoe moved to Area III and began the exploratory excavation of Adit No. 2. It was determined that 10' of 6" perforated collector pipe and 52' of 6" PVC drain would adequately drain this adit. Adit No. 1

did not require a drainage facility. In Area IV, the dump trucks hauled to the outlying pits while the 966 loader hauled to the closer pits. Provide water was used as needed with the loaded hauling units providing the compaction. The backhoe was used to close Adit No. 1, one additional adit found in Area III during construction and also three in Area I and two in Area II. Debris cleanup was on-going in all areas with the wood structures collapsed and all combustible materials gathered and burned on site. All the non-biodegradable materials were gathered and buried in a washout in the spoil pile grading area in Area II. The backhoe was also used in Area I and III to grade spoil and place topsoil in areas that had scattered brush growth to minimize the damage. This operation was somewhat slower for the Contractor but the additional Provide Topsoil used in covering spoil, in lieu of removing spoil to natural ground, resulted in contours more natural to surrounding slope. As the spoil areas were readied and prior to placing topsoil, lime was applied in a slurry solution using the hydroseeder. The topsoil was then replaced in the subsidence areas and Provide Topsoil was used over the waste piles and adit areas. The above operation was followed in Area II as well as at the Red Lodge Airport and was finished after October 1, the date that revegetation could commence, therefore no delay was encountered and no seedbed preparation was needed. The special grass drill used by the subcontractor was capable of placing both the fertilizer and grass seed at different seedbed levels in one operation on all areas flat enough to accommodate a tractor and drill. All other areas were hydroseeded, tracked where practical, and fertilized. All areas whether drilled or hydroseeded were hydro-mulched using a wood fiber mulch with a tackifying agent included. Farm fence was constructed to enclose and protect new vegetation from livestock in portions of Area II and the topsoil borrow area.

All surface disturbance caused by the use of access trails was revegetated by the same equipment and methods used above.

III. COST SUMMARY

A. FINAL PAYMENT REQUEST AND RECONCILIATION CHANGE ORDER

A copy of the Final Payment Request and Reconciliation Change Order are contained in Appendix A. These documents summarize the final quantities and costs for each work item.

B. CHANGE ORDERS

The following Change Orders were executed during the course of the project:

1. Change Order No. 1 - Equipment Use rental rates were used to cleanup Janskovitch's dump adjacent to Area II and to repair the roadside ditch adjacent to Airport Road. The Airport Road work included ditch repair, cleaning out of the previously constructed sediment basin and installation of gabion baskets in the ditch.
2. Change Order No. 2 - Reconciliation of Final Quantities.

C. COST PER SITE/UNIT

1.	Total Cost	\$157,588.45
2.	Cost Per Area	
	A. Area I	12,890.49
	B. Area II	46,277.38
	C. Area III	11,207.64
	D. Area IV	24,739.26
	E. Red Lodge Airport Site	62,473.68
3.	Cost Per Acre (based on disturbed area)	
	A. Area I - 1.21 Acres	\$ 10,653.30
	B. Area II - 6.55 Acres	7,065.25
	C. Area III - 3.15 Acres	3,557.98

D. Area IV - 6.09 Acres	4,062.28
E. Red Lodge Airport Site - 9.01 Acres	6,933.82

4. Cost Per Acre Per Work Item

A. Debris Cleanup	\$ 67.11/Acre *
B. Removal of Structures	1,000.00/Each
C. Close Mine Openings	300.00/Each
D. Subsidence Backfill	1,039.76/Acre **
E. Waste Pile Disposal	1,856.15/Acre ***
F. Lime Placement	75.00/Acre
G. Provide Topsoil - Imported	5,000.79/Acre ****
H. Seed	528.36/Acre
I. Fertilizer	37.75/Acre
J. Mulch	401.00/Acre
K. Fencing	1,938.17/Acre *****

* Based on 59.6 Acres

** Based on 10.1 Acres

*** Based on 4.3 Acres

**** Based on 14.4 Acres

***** Based on 3.7 Acres

IV. SUMMARY

A. COMPLETED RECLAMATION

The Contractor was allowed fifty-two (52) days to complete the project. The project was completed in fifty (50) days.

The project resulted in removing trash and structures, closing of mine openings, elimination of subsidence features and proper disposal of coal waste materials. Elimination of the health and safety hazards and revegetation of all disturbed areas will allow the area to return to its pre-mining condition.

B. COMMENTS

The Contractor completed the work as specified. His equipment was generally well-maintained and efficiently used. Time lost by equipment failure was minimal. The Contractor's personnel were cooperative and well versed in construction procedures.

The completed project complies with the Contract requirements. The L.C. Hanson Company has recommended acceptance of the project to the Department of State Lands.

When consent could not be obtained for the planned construction in Part of Area II, approximately 9.5 acres of debris cleanup and an estimated 4000 C.Y. of waste pile disposal work was eliminated from lump sum work items. Access to Area III was originally planned to be through the property where the consent could not be obtained. This access was along a steep existing trail. In order to mitigate the access impact across the property of the unconsenting landowner, the Contractor was asked to gain access to Area III from Area IV. This required an additional 7-8 mile one-way trip versus 1000± feet as originally planned. The Contractor was also requested to exercise extreme care in crossing the property to gain access to Area I. The Owner and Contractor agreed that the costs of the lump sum work items not performed in Area II would cover the additional costs of mobilization required as outlined above.

V. SLIDES

The Slide Logs and slides are contained in Appendix B.

APPENDIX A

Payment Request No. 2 (Final)

From: October 17, 1987

To: November 1987

Project Name: Virtue Gulch Project

Location: Carbon County, Mt.

Project No.: 86-46-1

Name Of Contractor: Montgomery Const.

Address: P.O. Box 755

Hilger, Mt. 59451

Summary Of Project Status

Amount of Original Contract	\$116,353.30
Amount of Approved Change Order(s)	41,235.15
TOTAL CONTRACT AMOUNT	157,588.45
Contract Time Used to Date	52 Days
Percentage of Contract Time Used	100%
Percentage of Contract Amount Earned	100%

Original Contract Amount Completed	153,012.95
Change Order(s) Amount Completed	4,575.50
Amount for Materials On Site	0.00
TOTAL To Date	157,588.45
Times 90% =	No Retainage
TOTAL AMOUNT Earned To Date	157,588.45
Less Previous Amount Earned	121,522.82
Amount Payable This Period	36,065.63
Less 1% Gross Receipts Tax	360.66
TOTAL DUE CONTRACTOR THIS PERIOD	35,704.97

Requested By:

(Contractor)

Date:

Checked By:

L.C. Hanson Co.

(Engineer)

Date:

Approved By: Department of State Lands
Abandoned Mine Reclamation Bureau

(Owner)

Date:

PAY REQUEST NO. 2 (Final)

L.C. Hanson Co.

PROJECT: LITTLE GULCH, CARBON COUNTY, MT.

CONTRACT NO. 34-46-121

Page 2 of 5

ITEMIZATION OF QUANTITIES AND COSTS

ITEM NO.	DESCRIPTION	ESTIMATED PLAN QUANTITY	UNIT BID PRICE	UNITS OF WORK COMPLETED THRU REQUEST	UNITS OF WORK COMPLETED TO DATE	TOTAL COST OF COMPLETED WORK	% OF EST. QUANT. COMP.
1	Mobilization	1.0 L.S.	3500.00	0.00	1.00	3500.00	100*
2	Debris Cleanup	1.00 L.S.	4000.00	0.00	1.00	4000.00	100*
3	Removal of Structures	1.00 L.S.	3000.00	0.00	1.00	3000.00	100*
4	Salvage & Reclaim Topsoil	2775.00 C.Y.	3.00	0.00	2779.00	8997.00	100*
5	Close Mine Openings						
	a. Adits	8.00 EACH	300.00	0.00	8.00	2400.00	100*
6	Subsidence Backfill	1203.00 C.Y.	2.00	0.00	5255.00	10312.00	100*
7	Waste Pile Disposal	1.00 L.S.	8000.00	0.00	1.00	8000.00	100*
8	Provide Water	225.00 MGAL.	10.00	0.00	33.80	338.00	100*
9	Line Placement	16.50 ACRE	75.00	0.00	12.67	950.25	100*
10	Trench Excavation, Type 1						
	W/ Type "A" Backfill	10.00 C.Y.	10.00	0.00	40.00	400.00	100*
11	16" Perforated PVC Drain						
	Pipe, SDR 35	10.00 L.F.	30.00	0.00	10.00	300.00	100*
12	16" PVC Drain Pipe,						
	SDR 35	30.0 L.F.	30.00	0.00	52.00	1040.00	100*
	Sub-Total					47437.25	

* Work completed on this item

PAY REQUEST NO. 2 (Final)

L.C. Hanson Co.

PROJECT: WISTUE CULCH, CARBON COUNTY, MT.

MOBILE AVE 36-42-121

Page 4 of 5

ITEMIZATION OF QUANTITIES AND COSTS

ITEM NO.	DESCRIPTION	ESTIMATED PLAN QUANTITY	UNIT BID PRICE	UNITS OF WORK COMPLETED THIS REQUEST	UNITS OF WORK COMPLETED TO DATE	TOTAL COST OF COMPLETED WORK	% OF EST. QUANT. COMP.
	CHANGE ORDER NO. 1						
	a. Equipment Rental-						
	Janakovich Pump						
	1.D-7E dozer	13.5 HR.	85.00	0.00	13.50	1147.50	100*
	2.966 CAT Loader	1.0 HR.	83.00	0.00	1.00	83.00	100*
	3.Cuap Truck	1.0 HR.	60.00	0.00	1.00	60.00	100*
	4.Laborer	4.0 HR.	25.00	0.00	4.00	100.00	100*
	Exploratory Excavation						
	Area III Adit 2, Reshap-						
	ing Ditch. Cleaning Sed-						
	iment Basin, Excavating						
	for Gabion Baskets						
	1. J.D.310 Backhoe	46.5 HR.	44.00	0.00	46.50	2046.00	100*
	Sub-Total					3436.50	
	Total					3436.50	

* Work completed on this item

PAY REQUEST NO. 2 (Final)

L.C. Hanson Co.

PROJECT: VIADUCT BRIDGE, CARSON COUNTY, MT.

MONY AVE 86-46-121

Page 5 of 5

ITEMIZATION OF QUANTITIES AND COSTS

ITEM NO.	DESCRIPTION	ESTIMATED PLAN QUANTITY	UNIT BID PRICE	UNITS OF WORK COMPLETED THIS REQUEST	UNITS OF WORK COMPLETED TO DATE	TOTAL COST OF COMPLETED WORK	% OF EST. QUANT. COMP.
	CHANGE ORDER NO. 1 (cont'd.)						
	1. Galv. Sation Baskets						
	6 #5"x1'	4.0 Each	32.00	0.00	4.00	128.00	100*
	9"x3"x1'	16.0 Each	43.00	0.00	16.00	688.00	100*
	2. Rock (4"x2")						
	Sabions	19.0 C.Y.	5.00	0.00	19.00	95.00	100*
	Ditch Repair	20.0 C.Y.	5.00	0.00	20.00	100.00	100*
	CHANGE ORDER NO. 2						
	1. Reconciliation of						
	Final Quantities	1.0 L.S.	36659.65	1.00	1.00	36659.65	100*
	Sub-Total					37579.65	
	Total					41107.15	

* Work completed on this item

2.12 CHANGE ORDER

Order No. 2Date: November 10, 1987Agreement Date: December 10, 1986NAME OF PROJECT: VIRTUE GULCH PROJECTCarbon County, MT MT A/E 86-46-121OWNER: Montana Department of State Lands - Abandoned Mine Reclamation BureauCONTRACTOR: Montgomery Construction, Hilger, MT 59451

Change Orders must be accompanied by an itemized cost breakdown. You are hereby requested to comply with the following changes from the Contract Documents. (Show separate costs for materials, labor, equipment and miscellaneous. Show percent where applicable.)

RECEIVED

NOV 23 1987

ITEM NO.	DESCRIPTION OF CHANGES - ESTIMATED QUANTITIES & UNITS	COST OF CHANGES					TOTAL COST
		MAT'LS	LABOR	EQUIP.	MISC.	TOTAL UNIT COST	
1.	RECONCILIATION OF FINAL QUANTITIES (See attached sheet)						+\$36,659.65
2.	RECONCILIATION OF CHANGE ORDER NO. 2						
	A. EQUIPMENT RENTAL						
	2. Exploratory Excavation, etc.						
	a. J.D. 310 Backhoe reduce by 8 hours			44.00			- 352.00
	b. Dump Truck, 12 C.Y. add 8 hours			60.00			+ 480.00
TOTAL COST - MAT'LS, LABOR, EQUIPMENT & MISC.					\$ 36,787.65		
OVERHEAD & PROFIT @ _____ %					Incl.		
GRAND TOTAL - THIS CHANGE ORDER					+\$ 36,787.65		

Original Contract Price \$116,353.30Current Contract Price Adjusted by Previous Change Order 120,800.80Cost This Change Order (+ or -) + 36,787.65New Contract Price Including This Change Order \$157,538.45

The completion date as set forth in the Contract Documents shall be (unchanged, increased, ~~decreased~~) by _____ calendar days.

The date for completion of all work will be November 5, 1987.

Description and Justification for Change:

1. The actual quantities shown were necessary to meet the field conditions encountered during construction.

SURETY CONSENT

The surety hereby consents to the aforementioned Contract Change Order and agrees that its bond or bonds shall apply and extend to the Contract as thereby modified or amended per this Change Order. The principal and the Surety further agree that on or after execution of this consent, the penalty of the applicable Performance Bond or Bonds is hereby increased by THIRTY SIX THOUSAND SEVEN HUNDRED EIGHTY SEVEN & 65/100-- (\$ 36,787.65-----) (One hundred percent (100%) of the Change Order amount) and the penalty of the applicable Payment Bond or Bonds is hereby increased by THIRTY SIX THOUSAND SEVEN HUNDRED EIGHTY SEVEN & 65/100----- (\$ 36,787.65-----) (One hundred percent (100%) of the Change Order amount).

COUNTERSIGNED BY MONTANA RESIDENT AGENT
COGSWELL AGENCY

BY: E. B. Cogswell
RESIDENT AGENT

SURETY
CONTINENTAL CASUALTY COMPANY

BY: E. B. Cogswell
E. B. COGSWELL (Seal)

Recommended by: L. C. Hanson Company Allan W. Thye, Engineer 11/12/87
Accepted by: Continental Casualty Company, Contractor 11/14/87
Approved by: Richard J. Furt, Owner 11/30/87

Change Order No. 2
VIRTUE GULCH

RECONCILIATION OF QUANTITIES

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	ACTUAL QUANTITY	CHANGE IN PRICE
4.	SALVAGE & REPLACE TOPSOIL	2775 C.Y.	2999 C.Y.	+\$ 672.00
6.	SUBSIDENCE BK FILL	1203 C.Y.	5256 C.Y.	+ 8106.00
8.	PROVIDE WATER	225 MGAL	33.6 MGAL	- 1912.00
9.	LIME PLACEMENT	16.5 ACRE	12.67 ACRE	- 287.25
10.	TRENCH EXCAVATION TYPE 1 W/ TYPE "A" BACKFILL	12 C.Y.	40 C.Y.	+ 280.00
12.	6" PVC DRAIN PIPE, SDR 35	30 L.F.	52 L.F.	+ 440.00
13.	PROVIDE TOPSOIL - IMPORTED	9522 C.Y.	14,064 C.Y.	+ 24,935.58
14.	SEED	887 LBS.	937.42 LBS.	+ 739.16
15.	FERTILIZER	2539 LBS.	2454.4 LBS.	- 33.84
16.	MULCH	52,000 LBS.	52,150 LBS.	+ 30.00
17.	FARM FENCE - F4W	1560 L.F.	3270 L.F.	+ 1710.00
18.	SINGLE PANEL	6 EACH	12 EACH	+ 600.00
19.	DOUBLE PANEL	1 EACH	8 EACH	+ 1400.00
21.	FARM GATE - TYPE G-2	48 L.F.	60 L.F.	+ 60.00
22.	DEADMAN	6 EACH	2 EACH	- 80.00
			TOTAL	\$ 36,659.65

APPENDIX B

SLIDE LOG

VIRTUE GULCH Area I

1.	9/16/87	Before	Road between Area I and II
2.	9/16/87	Before	Slack and spoil area above road
3.	9/16/87	Before	Spoil area below road
4.	9/16/87	Before	Tipple and slope area looking northwest
5.	9/16/87	Before	Spoil, tipple and Adit No. 3 area looking northeast
6.	9/16/87	Before	Spoil below tipple and road looking northeast
7.	9/23/87	Before	Adit No. 2 area
8.	9/23/87	Before	Adit No. 3 area
9.	9/23/87	Before	Adit No. 1 area
10.	10/16/87	After	Slack and spoil area above road-topsoil - See No. 2
11.	10/16/87	After	Spoil area below road - topsoil-See No. 3
12.	10/16/87	After	Spoil, tipple and Adit 3 area-Topsoil - See No. 4
13.	10/16/87	After	Spoil area below tipple and road-topsoil - See No. 6
14.	10/17/87	After	Road between Area I and II-hauling across Ocepek property-See No. 1
15.	10/17/87	After	Spoil, tipple and Adit 3-hydroseed, fertilize and mulch-See No. 4 and 12
16.	10/17/87	After	Spoil areas above and below road-hydroseed, fertilize and mulch-See No. 4 and 12

VIRTUE GULCH
Area II

17.	9/15/87	Before	Spoil pile and tipple
18.	9/15/87	Before	Tipple and concrete structure
19.	9/15/87	Before	Spoil pile looking north
20.	9/15/87	Before	Creek bank
21.	9/15/87	Before	Spoil pile looking northwest
22.	9/15/87	Before	Spoil outside of fence
23.	9/15/87	Before	Some of the debris outside of fence
24.	9/15/87	Before	Debris along creek bank
25.	9/18/87	Before	Waste Pile No. 1 and debris
26.	9/18/87	Before	Waste Pile No. 2 and debris
27.	9/18/87	Before	Spoil and Adit No. 2 area
28.	9/18/87	Before	Spoil and slope below Adit No. 2
29.	9/18/87	Before	Adit No. 2 and rubble
30.	9/18/87	Before	Spoil along road up the coulee
31.	9/29/87	Const.	Concrete structure defying laws of gravity and machine
32.	9/30/87	Const.	Concrete structure, day later, still standing
33.	9/30/87	Const.	Concrete structure tipped into hole before covering
34.	10/16/87	After	Spoil and tipple area - grading and topsoil
35.	10/16/87	After	Waste Area No. 1 - Removal of spoil and placing topsoil
36.	10/16/87	After	Waste Area No. 2 - removal of spoil and placing topsoil
37.	10/16/87	After	Waste Pile and Adit 2 area-removal of spoil and placing topsoil

- | | | | |
|-----|----------|-------|---|
| 38. | 10/17/87 | After | Waste Pile and Adit 2 area-
hydroseed, fertilize and mulch |
| 39. | 10/18/87 | After | Spoil area - hydroseed, fertilize
and mulch |

VIRTUE GULCH
Area III

40.	9/16/87	Before	Waste pile below Adit No. 1 looking northeast
41.	9/16/87	Before	Adit No. 1
42.	9/16/87	Before	Adit No. 2
43.	9/16/87	Before	Subsidence hole to be backfilled
44.	9/16/87	Const.	Subsidence hole not to be backfilled
45.	9/16/87	Before	Typical subsidence to be backfilled
46.	9/16/87	Before	Borrow area
47.	9/16/87	Before	Adit No. 2 area
48.	9/18/87	Const.	Water in Adit No. 2
49.	9/18/87	Before	Additional adit east of Adit No. 1
50.	9/18/87	Const.	Water source in Adit No. 2
51.	9/18/87	Const.	Looking up Exc. Trench into Adit No. 2
52.	9/18/87	Const.	6" perforated and 6" PVC drain in Adit No. 2
53.	10/12/87	After	Seed, fertilize and mulch
54.	10/12/87	After	Smaller waste piles - seed, fertilize and mulch
55.	10/12/87	After	Adit No. 1 - seed, fertilize and mulch
56.	10/12/87	After	Additional adit - seed, fertilize and mulch
57.	10/12/87	Const.	Hydro-mulcher
58.	10/12/87	After	Adit No. 2 - backfill
59.	10/12/87	After	Borrow area
60.	10/12/87	After	Subsidence area - seed, fertilize and mulch

VIRTUE GULCH
Area IV

61.	9/15/87	Before	Subsidence hole
62.	9/15/87	Before	New subsidence hole
63.	9/15/87	Const.	Topsoil pile and subsidence borrow area
64.	9/15/87	Const.	Topsoil from subsidence holes
65.	9/17/87	Const.	Subsidence backfill activity
66.	10/13/87	Const.	Drill with cultipacker
67.	10/13/87	After	Borrow area - spreading of topsoil
68.	10/13/87	After	Borrow area - spreading of topsoil
69.	10/13/87	After	Subsidence area - backfill and topsoil
70.	10/16/87	After	Subsidence and borrow areas - hydromulched

VIRTUE GULCH
Airport Road

71.	10/6/87	Before	Ditch to get gabion baskets
72.	10/6/87	Before	Mid-way down ditch
73.	10/6/87	Before	Lower ditch before installing gabion baskets
74.	10/6/87	Before	Sediment basin
75.	10/6/87	Const.	Filled gabion basket
76.	10/7/87	Const.	Stacked gabion baskets down to sediment basin
77.	10/8/87	After	First gabion basket and re-shaped ditch
78.	10/8/87	After	Mid-way down ditch after installing gabion basket and re-shaping
79.	10/8/87	After	Lower ditch after installing gabions and re-shaping

VIRTUE GULCH
Red Lodge Airport

80.	10/87	After	Topsoil borrow area
81.	10/87	Const.	Blading topsoil
82.	10/87	Const.	Blading topsoil
83.	10/87	Const.	Picking rock
84.	10/87	Const.	Grass drill
85.	10/87	Const.	Tractor and drill
86.	10/87	Const.	Mulch supply
87.	10/87	Const.	Mulch bags
88.	10/87	Const.	Mulcher at water source
89.	10/87	Const.	Water truck at water source
90.	10/87	Const.	Pumps at water source
91.	10/87	Const.	Loading mulcher
92.	10/87	Const.	Loading mulcher
93.	10/87	Const.	Mulching
94.	10/87	Const.	Mulching
95.	10/87	Const.	Mulching
96.	10/87	After	Site from across valley - green area

APPENDIX C

ANALYSIS OF PROFESSIONAL SERVICE FEES
 DATE OF PREPARATION: December 16, 1987
 PROJECT: Virtue Gulch

 PROFESSIONAL SERVICE AMOUNT

* Data Gathering, Site Evaluation, Preliminary Engineering, Final Engineering, Bidding Documents	\$6,559.97
* Construction Administration, Construction Inspection, Final Report Preparation	\$18,325.20

L.C. HANSON CO. COSTS	----- \$24,885.17 -----
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CONSTRUCTION COSTS	----- \$157,588.45 -----
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PERCENTAGE ANALYSIS

PRE-CONST. LCH CO COST/CONSTRUCTION COST	4.16%
CONST. & POST CONST. LCH CO. COST/CONSTRUCTION COST	11.63%
TOTAL LCH CO. COST/CONSTRUCTION COST	15.79%

REMARKS: Services provided include landowner consent, budget preparation, basic engineering, construction staking, contract administration, quantity accounting and full time resident inspection. When one landowner refused to grant consent for construction, additional time and expense were incurred for a boundary survey and a trip to the site to evaluate alternate access routes to the other work areas.
